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THE
ONTARIO WATER RESOURCES
COMMISSION

PARTIAL POLLUTION SURVEY

of the

TOWN OF HARRISTON

COUNTY OF WELLINGTON

1968

STANDARDS DEVELOPMENT BRANCH OMOE
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TOWN OF HARRISTON - 1968
COUNTY OF WELLINGTON

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Report on a partial pollution
survey of the town of Harrison,
county of Wellington.

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R E P O R T

on a

PARTIAL POLLUTION SURVEY

of

TOWN OF HARRISTON

COUNTY OF WELLINGTON

1968

Division of Sanitary Engineering

R E P O R T

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A partial water pollution survey was carried out in the Town of Harriston on September 17, 1968, in the company of Mr. J. Hoyt, the Public Health Inspector. The survey was conducted at the request of the Wellington-Dufferin-Guelph Health Unit to locate and evaluate sources of pollution to the Maitland River passing through the town.

SCOPE OF SURVEY

The survey was confined to the areas adjacent to the Maitland River flowing through the Town of Harriston.

The survey involved the examination and sampling of the river and sewer outfalls; an interview with the manager of the Harriston Public Utilities Commission; and a review of Commission files on water supply and waste treatment for the Town of Harriston.

The information, and results of analyses of samples, obtained during the survey are evaluated to determine what measures are required to prevent or eliminate water pollution.

DESCRIPTION OF AREA

The Town of Harriston is located in the north west corner of the County of Wellington. The assessed population is 1,571 with an assessment of \$1.97 million.

The town's economy is based largely on a retail trade to the surrounding agricultural area and on a few small industries.

The area is drained mainly by a system of storm drains discharging ultimately to the Maitland River.

The soil throughout most of the area is a well-drained loam till of glacial origin.

EXISTING SERVICES

Water Supply

The town is served by a municipal water supply system. The water is drawn from two drilled wells. Storage is provided by a 120,000 gallon elevated storage tank.

The system serves an estimated population of 1,685 through 700 service connections. The average daily water consumption from January to June 1968 was 178,000 gallons.

Waste Disposal

Approximately 60 per cent of the town uses private septic tank systems for the disposal of domestic wastes and

the installations are supervised by the Wellington-Dufferin-Guelph Health Unit. The remainder of the town is serviced by sanitary sewers for disposal of the wastes at the municipal sewage treatment facility.

Except for isolated adverse conditions on Elizabeth Street and Robertson Street, the septic tank systems appeared to be operating satisfactorily at the time of the investigation.

During the survey it was noted that a number of storm sewers were carrying domestic wastes to the Maitland River, particularly in the King, Queen and Robertson Street areas. Thus there are apparently a number of illegal domestic connections to the storm sewers indicating that some septic tank systems are malfunctioning in the area and that the situation was corrected by connecting the systems to the storm sewer.

Refuse Disposal

The municipal refuse disposal area is located near the banks of the Maitland River in the west end of town. During heavy rainfall leachate from the area could gain access to the river. Progress is being made however by the health unit to locate the disposal area in a more acceptable location in Minto Township.

During the survey it was noted that the Massey Ferguson store, and the Leslie Ford Service Centre dump their refuse on the banks of the Maitland River. The situation represents a nuisance condition and a source of pollution to the river and should be eliminated as soon as possible.

PRESENTATION OF RESULTS

The results of the analyses of samples collected during the survey are shown in the appendix. The sampling locations are shown on the accompanying map of the study area.

The common indicators of domestic wastes are the biochemical oxygen demand (BOD), suspended solids, anionic detergents (ABS) and coliform organisms. An explanation and the significance of these analyses is provided at the end of the report.

The results of the analyses indicate that domestic wastewater is gaining access to the Maitland River. In five of the six samples collected, the bacteriological examination showed the presence of coliform organisms to be in excess of the Commission's objective of 2,400 per 100 ml. The BOD at two of the discharges exceeded the 15 ppm objective for

discharges to a watercourse. The fact that ABS was shown to be present in three of the discharges is indicative of domestic pollution, as ABS does not occur naturally.

It should be noted that sample MH 85.51 (W) was from the storm sewer near King Street. There was no ABS present, very little BOD, but a high flow of clear, cold water. Since the weather had been dry for some time, it is possible that there was a leak in a water main in that area at that time.

CONCLUSIONS

The presence of domestic waste discharges to the Maitland River in the Town of Harriston is confirmed and is attributed to illegal connections being made by some householders to the storm sewers.

The construction of the sanitary sewer proposed for Queen Street and from Young Street to Lorne Street should solve the problem along this street. Further, because of the illegal connections to the storm sewers and the malfunctioning septic tank systems in the King, Elizabeth, and Robertson Street areas the town is requested to consider these areas next in any future sewer expansion programmes. The town should also

ensure that the dumping of refuse on the river banks by the Massey-Ferguson store and the Leslie Ford Service Centre be stopped, and that the present accumulations of garbage be removed to the municipal refuse disposal area.

RECOMMENDATIONS

1. In the staging of future sewer expansion programmes the King, Elizabeth, and Robertson Streets should be given priority.
2. The dumping of refuse on the Maitland River banks should be prohibited and present accumulations of debris removed to the municipal refuse disposal area.

Prepared by: _____

/fr

L. W. Bracewell, Engineer
Division of Sanitary Engineering

TOWN OF HARRISTON

<u>No.</u>	<u>Sample Location</u>	<u>Date</u>	<u>5-Day BOD</u>	<u>SOLIDS Total</u>	<u>Susp.</u>	<u>Anionic Detergents as ABS</u>	<u>Coliforms 100 ml</u>
MH-85.46W	Storm Sewer Out- let Near Young St. at Maitland River	Sept. 17/68	50	990	41	11.5	8,150,000
MH-85.47W	Six-Inch Tile Outlet Just Upstream of Above Location	"	--	---	--	----	8,100,000
MH-85.49W	Storm Sewer Outfall between King and Queen St.	"	24	698	17	1.4	800,000
MH-85.51W	Storm Sewer Out- fall at Foot of King Street	"	1.8	382	3	0.0	6,500
MH-85.55	Maitland River at Foot Bridge in Park	"	0.8	326	2	0.0	2,400
MH-84.72	Maitland River Down- stream of Town	"	1.4	402	16	----	-----
MH-84.57T	Harriston Sewage Lagoon Effluent	"	11	926	42	0.3	14,000
MH-84.97D	Ditch Contents at foot of Robertson Street	Aug. 1/68	270	924	69	49.0	-----

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

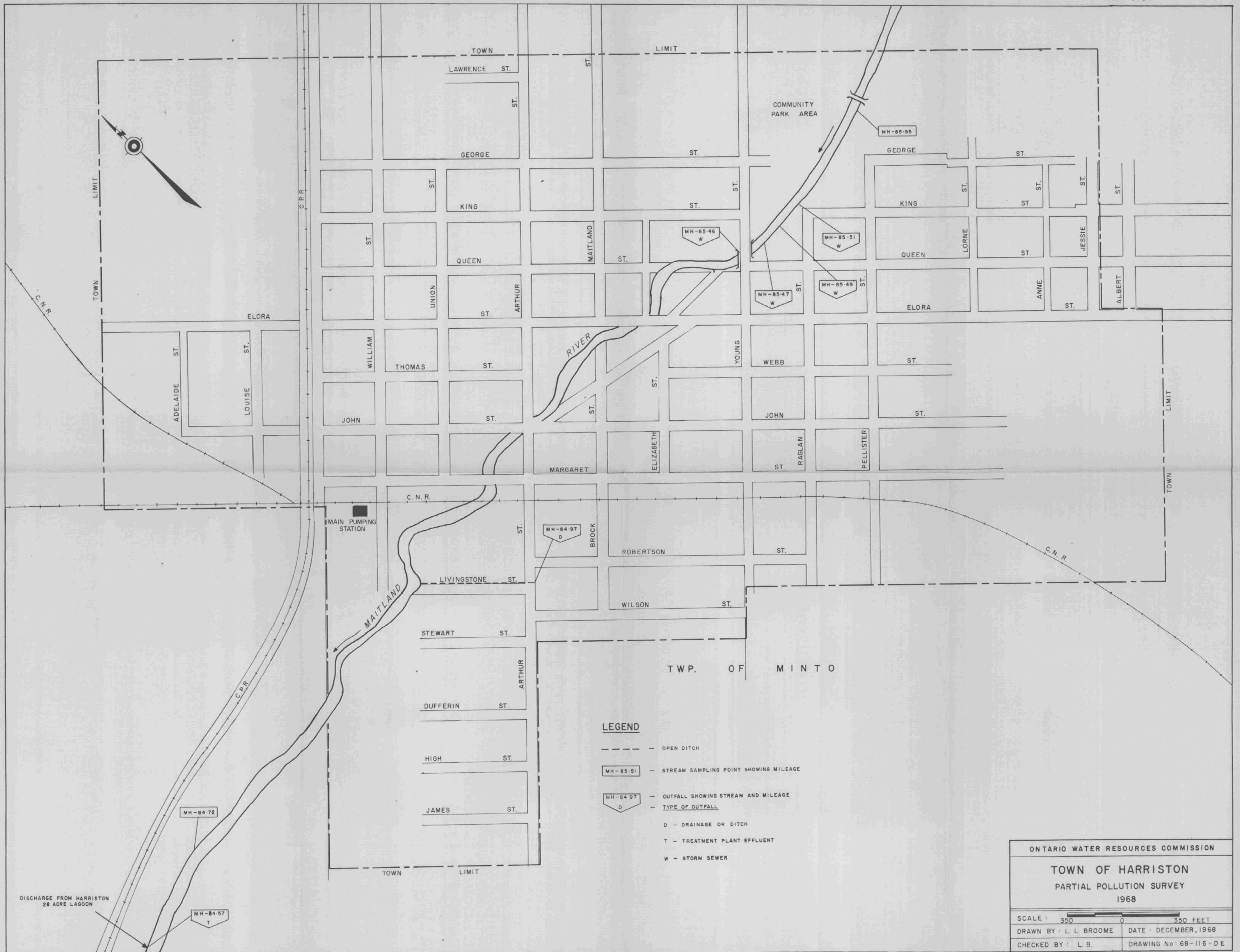
A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



LEGEND

- OPEN DITCH
- MH-85-51 -- STREAM SAMPLING POINT SHOWING MILEAGE
- MH-84-97 -- OUTFALL SHOWING STREAM AND MILEAGE
- TYPE OF OUTFALL
- D - DRAINAGE OR DITCH
- T - TREATMENT PLANT EFFLUENT
- W - STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

**TOWN OF HARRISTON
PARTIAL POLLUTION SURVEY
1968**

SCALE : 350 0 350 FEET
 DRAWN BY : L. L. BROOME DATE : DECEMBER, 1968
 CHECKED BY : L. B. DRAWING No: 68-116-DE